Conclusion and Epilogue

Thus, it can be seen from the above descriptions, a novel method for forming an interactive apparatus, employing tactilely enhanced visual images, has been described.

While the present invention has been described in terms of the foregoing embodiments, those skilled in the art will recognize that the invention is not limited to the embodiments described. The present invention can be practiced with modification and alteration within the spirit and scope of the appended claims. Thus, the description is to be regarded as illustrative instead of restrictive on the present invention.

What is claimed is:

1. An apparatus comprising:

a touch sensitive visual display including a flexible visual display layer, a touch sensitive layer, and a tactile display layer, the flexible visual display layer configured to render visual images using a matrix of pixels, the touch sensitive layer, having a hollowed effective area, configured to provide touch sensing for non-tactilely enhanced visual images, and the tactile display layer, having an effective core area substantially aligned with the ineffective area of the touch sensitive layer, configured to tactilely enhance at least a portion of the rendered visual images using pistons and to detect contact with the rendered tactilely enhanced visual images;

a first display driver to control selective activation/deactivation of the pixels of the flexible visual display layer to facilitate rendering of visual images on the flexible visual display layer; and

a second display driver to control the pistons of the tactile display layer to facilitate complementary selective tactile indenting of different portions of a part of the flexible visual display layer that is complimentary to the effective core area of the tactile display layer, said selective tactile indenting to tactilely enhance at least a part of at least one of the rendered visual images.

2. The apparatus of claim 1, wherein the tactilely enhanced visual images comprise dynamically formed non-persistent (DFNP) input keys.

3. The apparatus of claim 2, wherein the DFNP input keys comprise a DFNP input key group selection key to facilitate selection of one of a plurality of DFNP input key groups, each having one or more DFNP input keys.

4. The apparatus of claim 3, wherein the DFNP input key groups comprise at least two of a DFNP alphabet input key group, a DFNP numeric key group, a DFNP punctuation input key group, a DFNP special character input key group, and a DFNP function key group.

5. The apparatus of claim 2, wherein the DFNP input keys comprise a selected one of DFNP alphabet input keys and DFNP numeric input keys.

6. The apparatus of claim 2, wherein the DFNP input keys comprise a selected one of DFNP punctuation input keys and DFNP special character keys.

7. The apparatus of claim 2, wherein the DFNP input keys comprise a DFNP function key.

8. The apparatus of claim 7, wherein the DFNP function key is a selected one of a DFNP go up key, a DFNP go down key, a DFNP go left key and a DFNP go right key.

9. The apparatus of claim 7, wherein the DFNP function key is a selected one of a DFNP page up key and a DFNP page down key.

10. The apparatus of claim 7, wherein the DFNP function key is a selected one of a DFNP start key, a DFNP stop key, a DFNP forward key and a DFNP reverse key.

11. The apparatus of claim 7, wherein the DFNP function key is a selected one of a DFNP select key, a DFNP channel up/down key, a DFNP volume up/down key, and a DFNP volume mute key.

12. The apparatus of claim 7, wherein the DFNP function key is a device selection key to facilitate selection of one of a plurality of devices controlled by the apparatus.

13. The apparatus of claim 7, wherein the DFNP function key is a selected one of a DFNP call key and a DFNP end call key.

14. The apparatus of claim 1, wherein the tactilely enhanced visual images comprise selected ones of user selectable menu items and user selectable list items.

15. The apparatus of claim 1, further comprising a collection of graphics functions, communicatively coupled to the first and second device drivers, to facilitate an application in rendering the tactilely enhanced visual images, the graphics functions further adapted to determine if one or more of the rendered visual images are to be tactilely enhanced.

16. The apparatus of claim 15, wherein at least one of the graphics functions is equipped to generate a plurality of pixel and piston data of the tactilely enhanced visual image to be rendered, based at least in part on an image specification specifying the tactilely enhanced visual image to be rendered.

17. The apparatus of claim 16, wherein the image specification comprises

an identification of the visual image to be rendered; and

one or more tactile attribute specifications specifying one or more tactile attributes for tactile enhancements of the rendered visual image.

18. The apparatus of claim 17, wherein the tactile attributes comprise at least a selected one of a tactile pin height attribute, a tactile pin pattern attribute, and a tactile pin hardness attribute.

19. The apparatus of claim 17, wherein the tactile attributes comprise at least two of a tactile pin height attribute, a tactile pin pattern attribute, and a tactile pin hardness attribute.

20. The apparatus of claim 17, wherein the tactile attributes comprise at least a tactile pin height attribute, a tactile pin pattern attribute, and a tactile pin hardness attribute.

21. The apparatus of claim 1, wherein the apparatus further comprises a third device driver to detect a user selection of a tactilely enhanced visual image.

22. The apparatus of claim 21, wherein the second and third device drivers are functions of the same device driver.

23. The apparatus of claim 1, wherein the apparatus is a selected one of a multi-device remote control, a personal digital assistant, and a wireless mobile phone.

24. The apparatus of claim 1, wherein the apparatus is a selected one of a palm sized computer, a tablet computer, a laptop computer, a desktop computer, a set-top box, and a media player.

25. A method comprising:

receiving a request for a graphics operation to render a visual image;

determining if the visual image is to be tactilely enhanced; and

if the visual image is to be tactilely enhanced, generating in response, a plurality of pixel and piston data for said tactilely enhanced visual image to be rendered, the